

FIG. 1

- 10) PROCESSOR
- 20) MAIN MEMORY
- 21) MAIN MEMORY MANAGEMENT INFORMATION
- 60) ADDED MAIN MEMORY
- 50) CONNECTING SWITCH
- 30) ADDITION REPORTING MEANS
- 40) CONNECTION MANAGING MEANS

FIG. 2

- 21) MAIN MEMORY MANAGEMENT INFORMATION
- 22) AVAILABLE START ADDRESS
- 23) AVAILABLE END ADDRESS

FIG. 3

- 10) PROCESSOR
- 20) MAIN MEMORY
- 21) MAIN MEMORY MANAGEMENT INFORMATION
- 60) ADDED MAIN MEMORY
- 80) BUS
- 30) ADDITION REPORTING MEANS
- 70) BUS CONTROLLING MEANS

FIG. 4

- 100) COMPUTER

200-1) FIRST MEMORY
220) STORAGE FACILITY
230-1) USER REGION
240) OS REGION
250) RESOURCE MANAGEMENT INFORMATION
21) MAIN MEMORY MANAGEMENT INFORMATION
210) MEMORY BUS INTERFACE
130) I/O DEVICE
110) PROCESSOR
200-2) SECOND MEMORY
230-2) USER REGION
150) BUS
30) ADDITION REPORTING MEANS
70) BUS CONTROLLING MEANS
120) NONVOLATILE MEMORY
122) CONFIGURATION INFORMATION
123) REAL MEMORY SIZE INFORMATION
124) EXPANDABLE MEMORY INFORMATION
140) SECONDARY STORAGE DEVICE
143) DATA

FIG. 5

START INITIALIZING PROCESS

310) LET FIRMWARE 121 INITIALIZE PROCESSOR 110
320) LET FIRMWARE 121 INITIALIZE FIRST MEMORY 200-1

330) LET FIRMWARE 121 INITIALIZE I/O DEVICE 130 AND
SECONDARY STORAGE DEVICE 140
340) LET FIRMWARE 121 READ OS 141 FROM SECONDARY STORAGE
DEVICE 140 AND WRITE IT TO MEMORY 200
350) PASS CONTROL FROM FIRMWARE 121 TO OS 141
360) LET OS 141 READ CONFIGURATION INFORMATION 122 USING
FIRMWARE 121 TO PREPARE RESOURCE MANAGEMENT INFORMATION 250
END INITIALIZING PROCESS

FIG. 6

START MEMORY ADDING PROCESS

405) LET ADDITION REPORTING MEANS 30 REQUEST BUS
CONTROLLING MEANS 70 TO CLOSE BUS 150
408) LET BUS CONTROLLING MEANS 70 CLOSE BUS 150
410) CONNECT SECOND MEMORY 200-2 TO BUS 150
415) LET ADDITION REPORTING MEANS 30 REQUEST BUS
CONTROLLING MEANS 70 TO OPEN BUS 150
418) LET BUS CONTROLLING MEANS 70 OPEN BUS 150
420) START UTILITY 142 TO CALL FIRMWARE 121
430) LET FIRMWARE 121 INITIALIZE SECOND MEMORY 200-2 TO
UPDATE REAL MEMORY SIZE INFORMATION 123
440) LET UTILITY 142 CALL OS TO ACQUIRE REAL MEMORY SIZE
INFORMATION 123 AND TO UPDATE MAIN MEMORY MANAGEMENT
INFORMATION 21
END MEMORY ADDING PROCESS

FIG. 7

- 21) MAIN MEMORY MANAGEMENT INFORMATION
- 22) AVAILABLE START ADDRESS
- 23) AVAILABLE END ADDRESS
- 24) UNTRANSLATABLE START ADDRESS
- 25) UNTRANSLATABLE END ADDRESS
- 26) LOGICAL-PHYSICAL ADDRESS TRANSLATION PAIRS
- 27) FREE LIST

FIG. 8

- 1) LOGICAL-PHYSICAL ADDRESS TRANSLATION PAIRS
- 2) ADDRESS
- 3) PHYSICAL ADDRESS
- 4) LOGICAL ADDRESS
- 5) MANAGEMENT INFORMATION
- 6) RESERVED AREA
- 7) LOGICAL-PHYSICAL TRANSLATABLE REGION
- 8) USABLE AREA
- 9) UNTRANSLATABLE REGION
- 230-2) USER REGION (ADDED)
- 230-1) USER REGION
- 240) OS REGION
- 250) RESOURCE MANAGEMENT REGION
- 21) MEMORY MANAGEMENT INFORMATION

26) LOGICAL-PHYSICAL ADDRESS TRANSLATION PAIRS

FIG. 9

START REGION RESERVING PROCESS

510) CALCULATE MONOPOLIZED MAIN MEMORY SIZE NEEDED TO

RESERVE ONE PAGE OF VIRTUAL MEMORY

520) DETERMINE RESERVABLE UPPER LIMIT BASED ON THE
CALCULATED VALUE AND ON CURRENTLY INSTALLED MAIN MEMORY
SIZE

530) LET USER SELECT VALUE BELOW THE RESERVABLE UPPER LIMIT
AND RESERVE SELECTED VALUE

540) SET RESERVED VALUE TO EXPANDABLE MEMORY INFORMATION

124

END REGION RESERVING PROCESS

FIG. 10

1010) MAXIMUM EXPANDABLE MEMORY SIZE:

MINIMUM EXPANDABLE MEMORY SIZE:

1020) RECOMMENDED ADDITIONAL MEMORY SIZE:

1030) ADDED MEMORY SIZE >

FIG. 11

120) NONVOLATILE MEMORY

122) CONFIGURATION INFORMATION

123) REAL MEMORY SIZE INFORMATION

124) EXPANDABLE MEMORY INFORMATION
125) NORMALLY OPERATING MEMORY SIZE INFORMATION IN EFFECT
UPON SETTING

FIG. 12

START REGION RESERVING PROCESS

510) CALCULATE MONOPOLIZED MAIN MEMORY SIZE NEEDED TO
RESERVE ONE PAGE OF VIRTUAL MEMORY
520) DETERMINE RESERVABLE UPPER LIMIT BASED ON THE
CALCULATED VALUE AND ON CURRENTLY INSTALLED MAIN MEMORY
SIZE
530) LET USER SELECT VALUE BELOW THE RESERVABLE UPPER LIMIT
AND RESERVE SELECTED VALUE
540) SET RESERVED VALUE TO EXPANDABLE MEMORY INFORMATION
124
550) SET NORMALLY OPERATING CURRENT MEMORY SIZE TO NORMALLY
OPERATING MEMORY SIZE INFORMATION 125 IN EFFECT UPON
SETTING
END REGION RESERVING PROCESS

FIG. 13

START INITIALIZING PROCESS

310) LET FIRMWARE 121 INITIALIZE PROCESSOR 110
320) LET FIRMWARE 121 INITIALIZE FIRST MEMORY 200-1
325) LET FIRMWARE 121 SET EXPANDABLE MEMORY INFORMATION 124

330) LET FIRMWARE 121 INITIALIZE I/O DEVICE 130 AND
SECONDARY STORAGE DEVICE 140
340) LET FIRMWARE 121 READ OS 141 FROM SECONDARY STORAGE
DEVICE 140 AND WRITE IT TO MEMORY 200
350) PASS CONTROL FROM FIRMWARE 121 TO OS 141
360) LET OS 141 READ CONFIGURATION INFORMATION 122 USING
FIRMWARE 121 TO PREPARE RESOURCE MANAGEMENT INFORMATION 250
END INITIALIZING PROCESS

FIG. 14

START EXPANDABLE MEMORY INFORMATION SETTING PROCESS
610) IS NORMALLY OPERATING MEMORY SIZE IN EFFECT UPON
SETTING DIFFERENT FROM NORMALLY OPERATING CURRENT MEMORY
SIZE?
620) SET ZERO TO EXPANDABLE MEMORY INFORMATION 124
END EXPANDABLE MEMORY INFORMATION SETTING PROCESS

FIG. 15

120) NONVOLATILE MEMORY
122) CONFIGURATION INFORMATION
123) REAL MEMORY SIZE INFORMATION
124) EXPANDABLE MEMORY INFORMATION
126) TOTAL MEMORY SIZE INFORMATION
127) NORMALLY OPERATING MEMORY SIZE LOWER LIMIT
128) LIMIT TO MAXIMUM RATIO BETWEEN EXPANDABLE MEMORY SIZE

AND NORMALLY OPERATING MEMORY SIZE

FIG. 16

START PROCESS ALLOWING USER TO DESIGNATE CONFIGURATION
INFORMATION

710) RECEIVE SUM OF NORMALLY OPERATING MEMORY SIZE AND
EXPANDABLE MEMORY SIZE FROM USER AND SET THE SUM TO REGION
126 IN NONVOLATILE MEMORY

720) RECEIVE NORMALLY OPERATING MEMORY SIZE LOWER LIMIT
FROM USER AND SET THE LIMIT TO REGION 127 IN NONVOLATILE
MEMORY

730) RECEIVE MAXIMUM RATIO BETWEEN EXPANDABLE MEMORY SIZE
AND NORMALLY OPERATING MEMORY SIZE FROM USER AND SET THE
RATIO TO REGION 128 IN NONVOLATILE MEMORY

END PROCESS ALLOWING USER TO DESIGNATE CONFIGURATION
INFORMATION

FIG. 17

START EXPANDABLE MEMORY INFORMATION SETTING PROCESS

810) NORMALLY OPERATING MEMORY SIZE \geq NORMALLY OPERATING
MEMORY SIZE LOWER LIMIT?

840) SET ZERO TO EXPANDABLE MEMORY INFORMATION 124

820) {TOTAL MEMORY SIZE - NORMALLY OPERATING MEMORY
SIZE}/NORMALLY OPERATING MEMORY SIZE \leq MAXIMUM RATIO?

850) SET {NORMALLY OPERATING MEMORY SIZE X MAXIMUM RATIO}

TO EXPANDABLE MEMORY INFORMATION 124

830) SET {TOTAL MEMORY SIZE - NORMALLY OPERATING MEMORY
SIZE} TO EXPANDABLE MEMORY INFORMATION 124

END EXPANDABLE MEMORY INFORMATION SETTING PROCESS

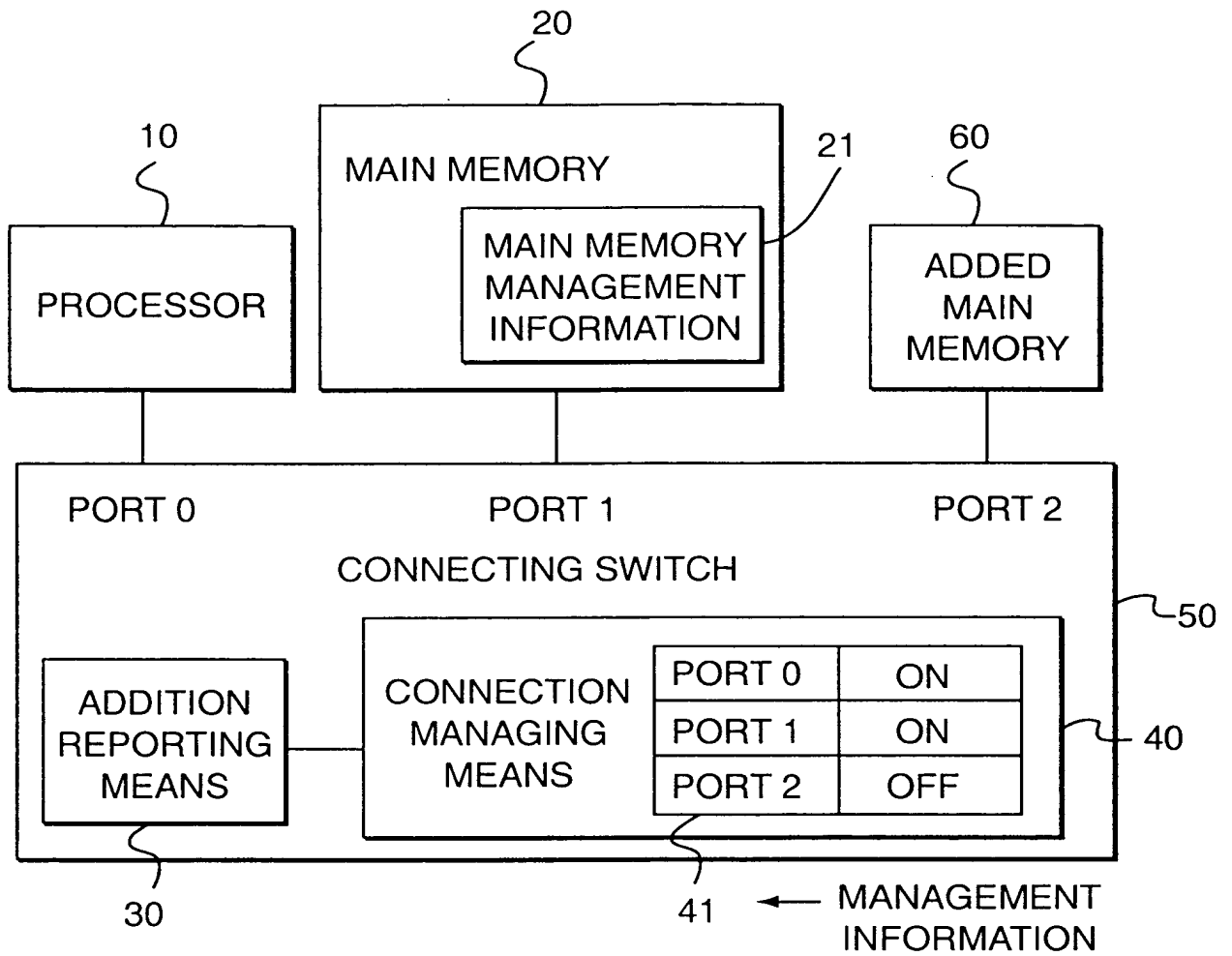


FIG. 1

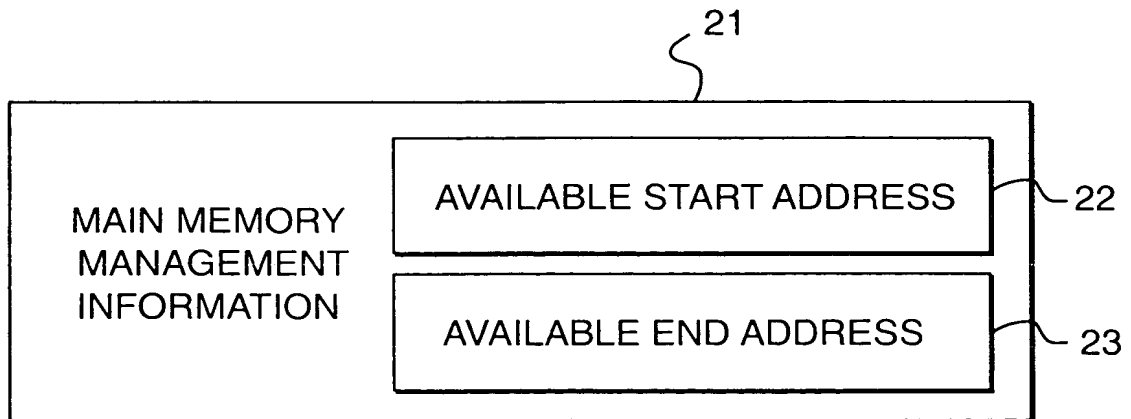


FIG. 2

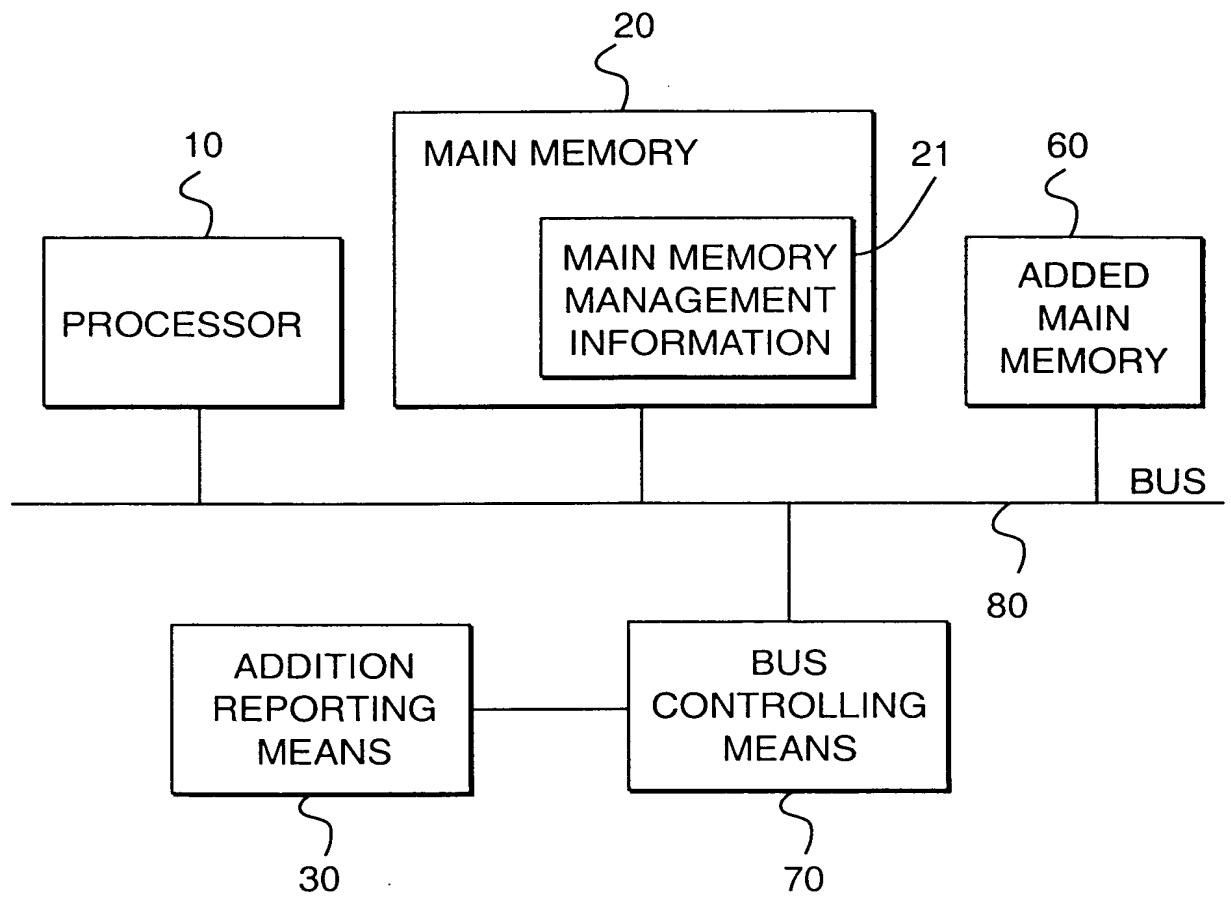


FIG. 3

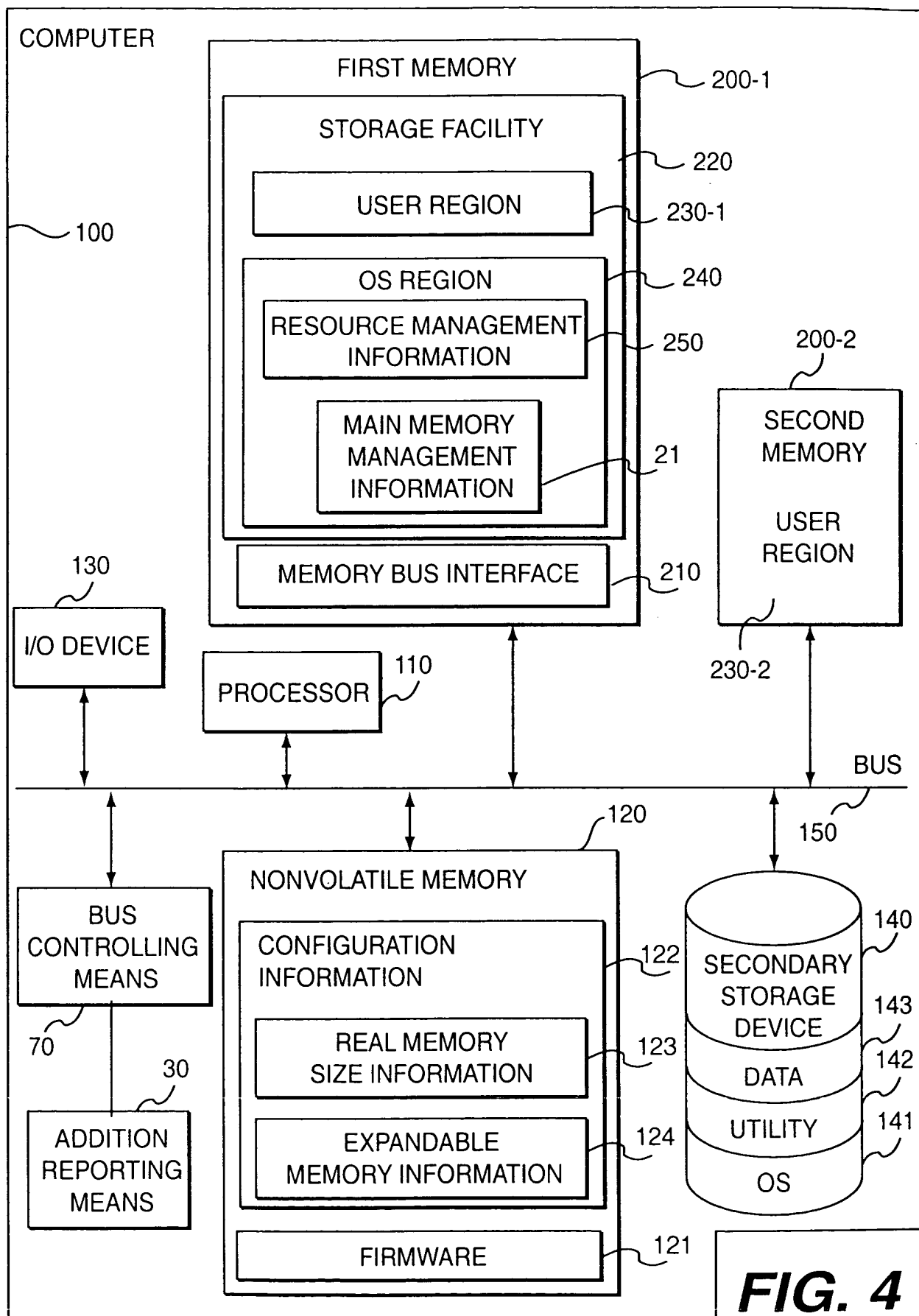


FIG. 4

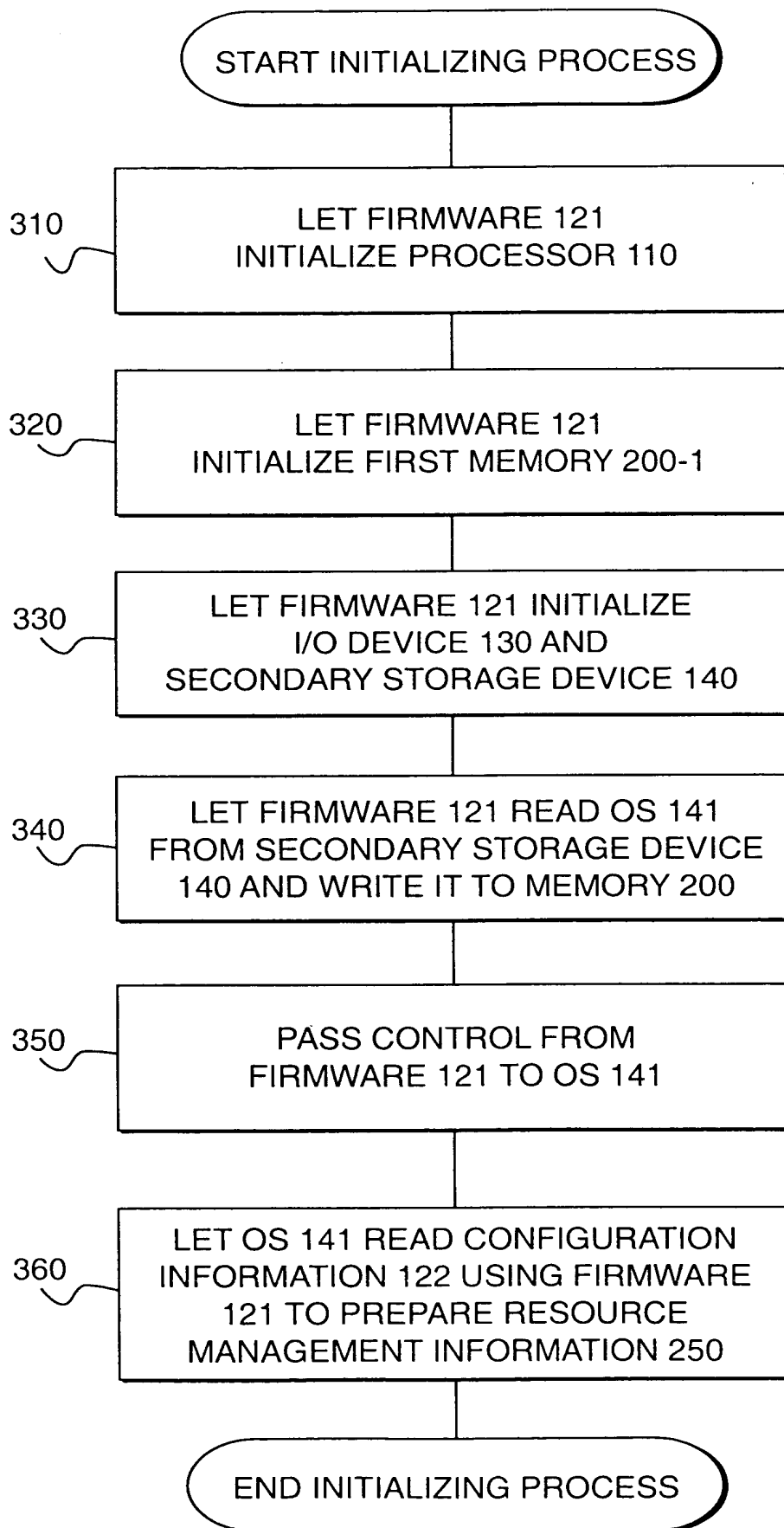


FIG. 5

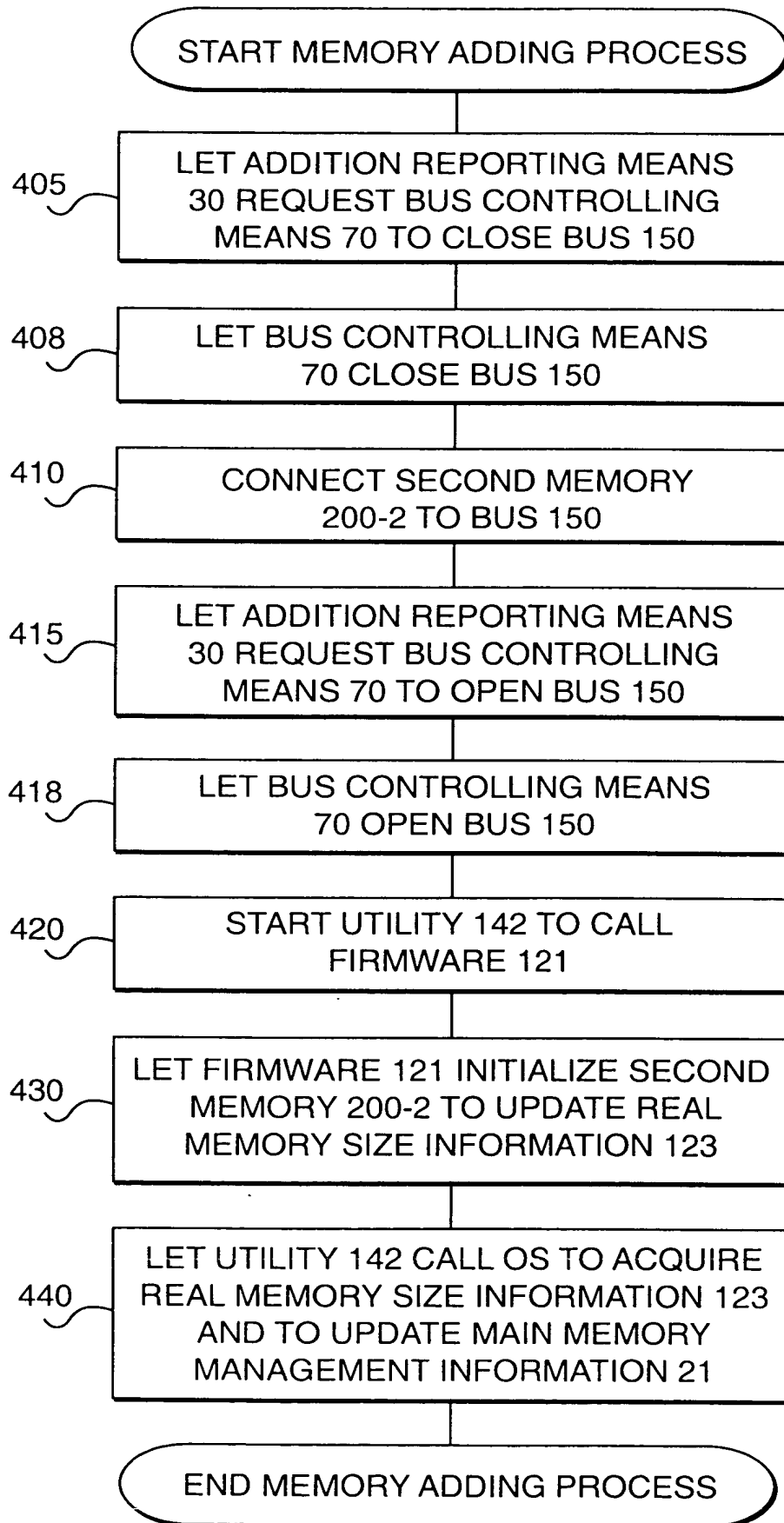


FIG. 6

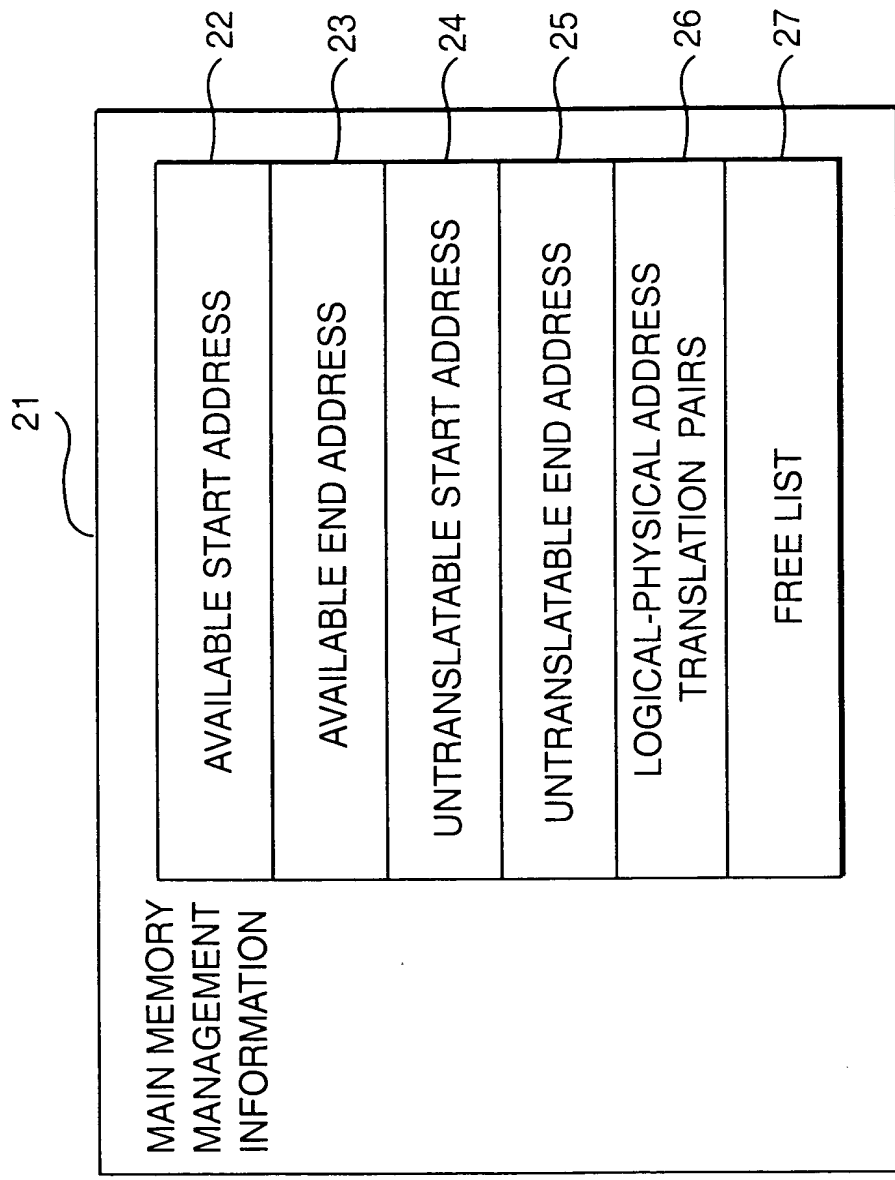


FIG. 7

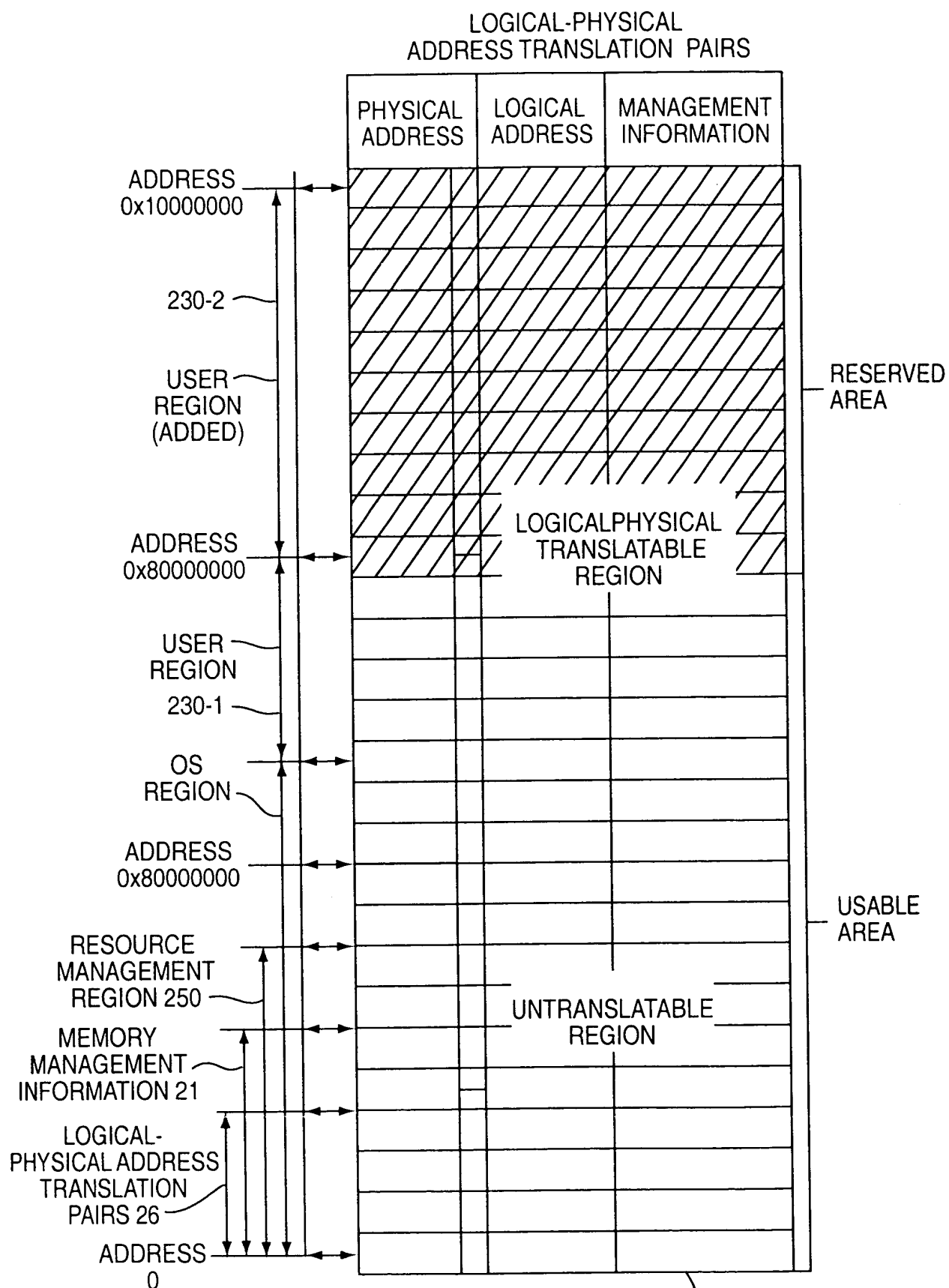


FIG. 8

252

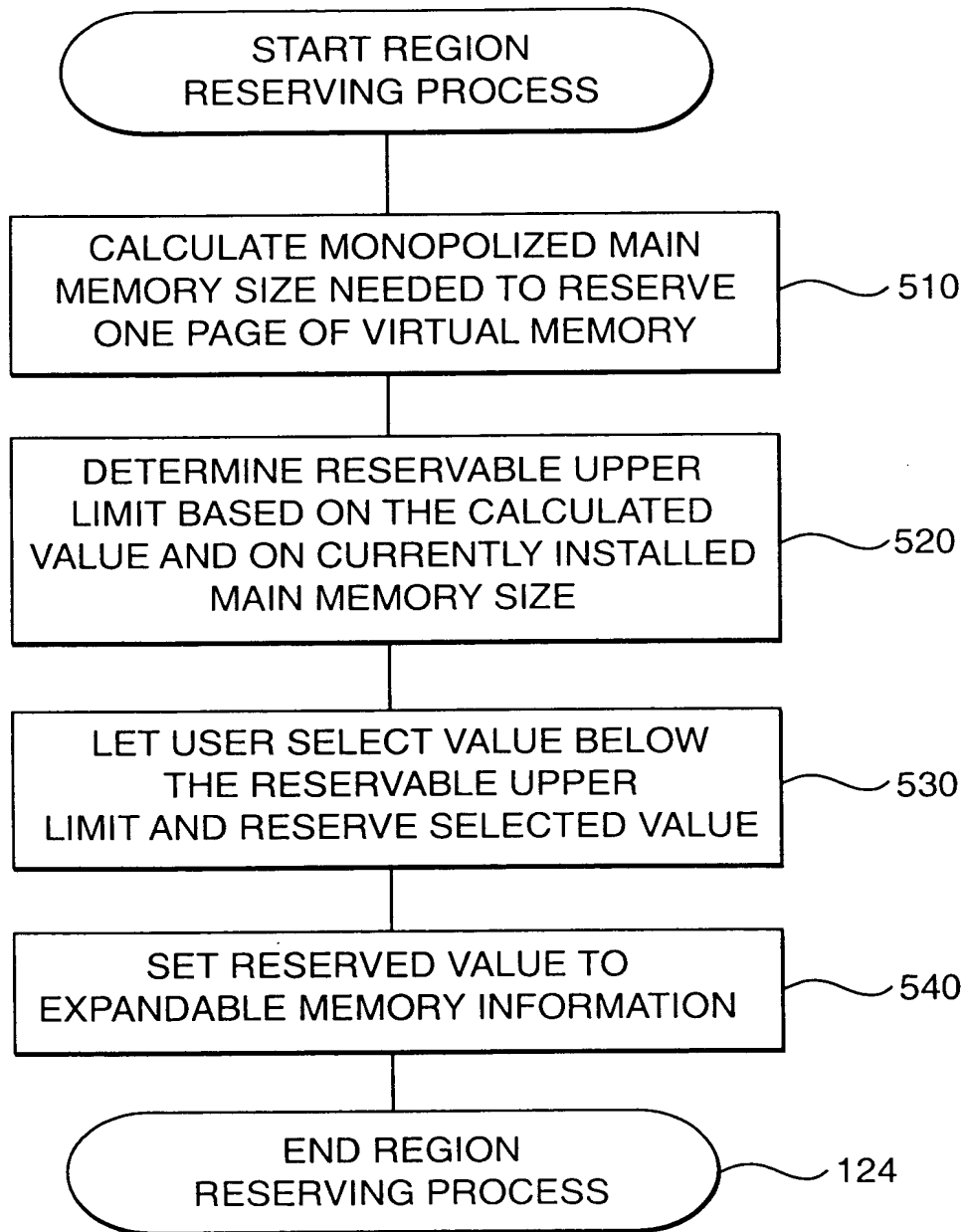


FIG. 9

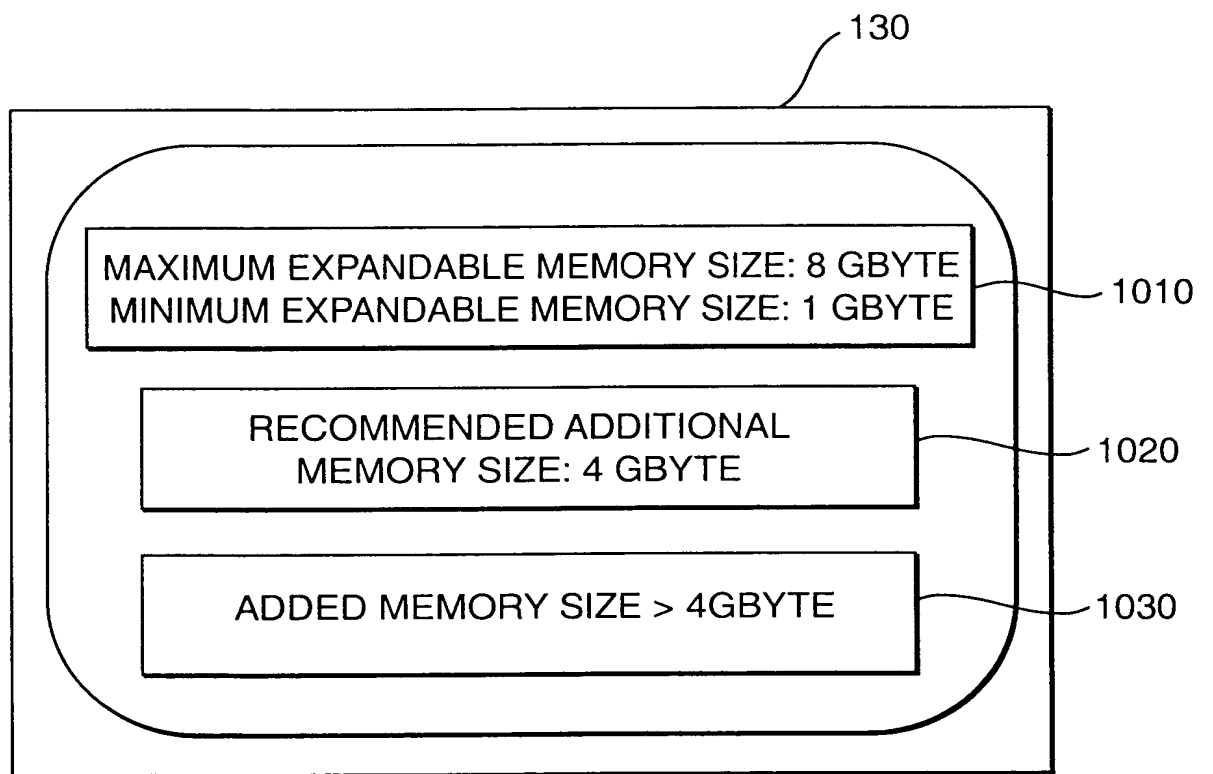


FIG. 10

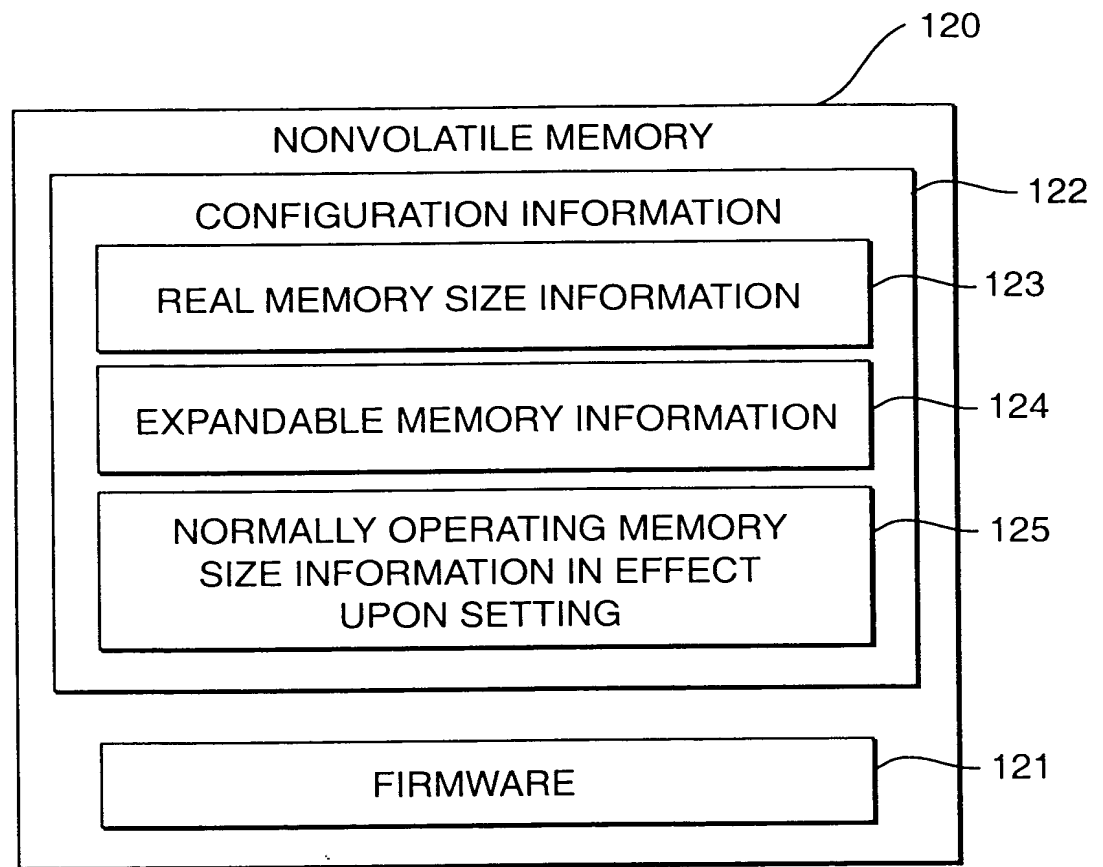


FIG. 11

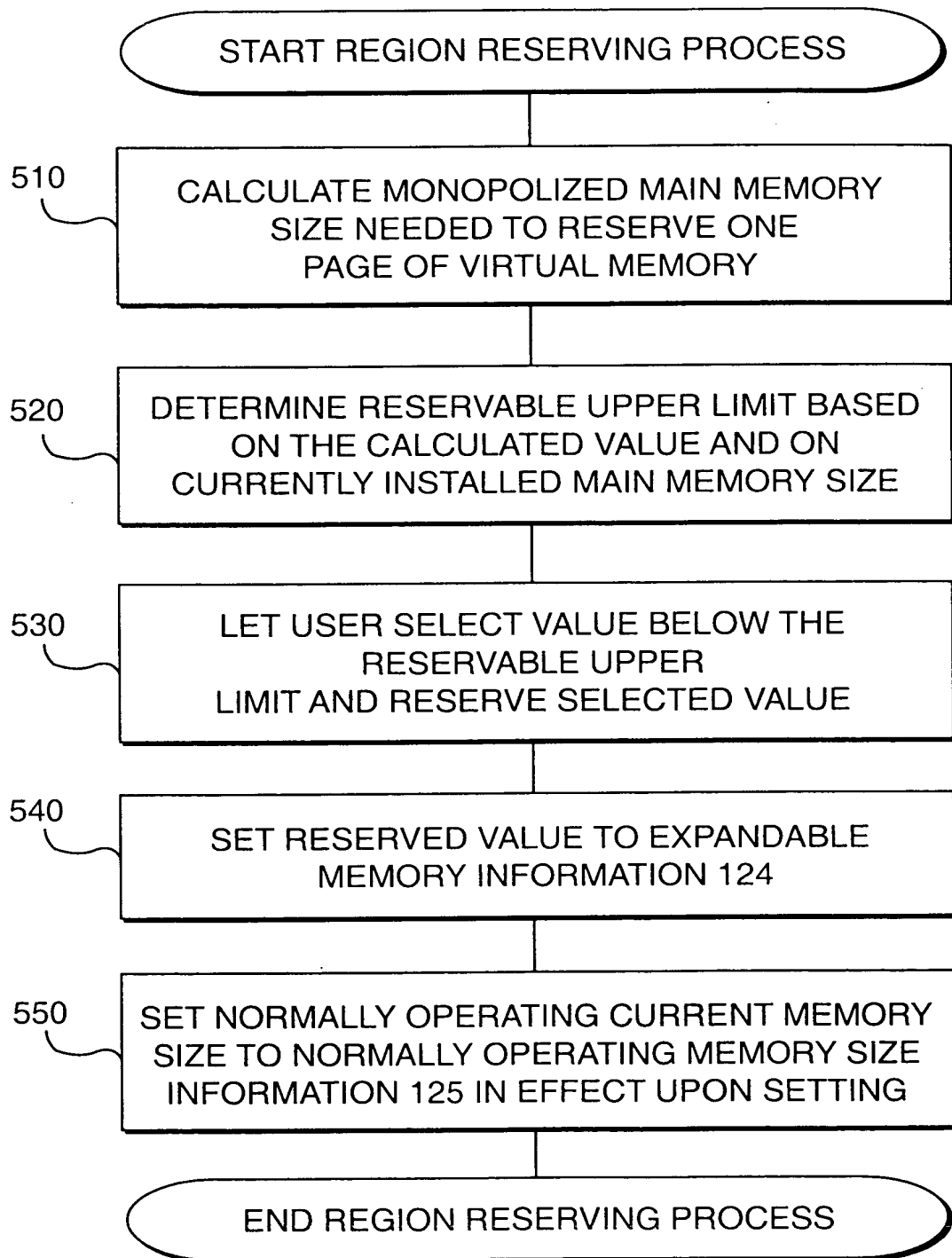


FIG. 12

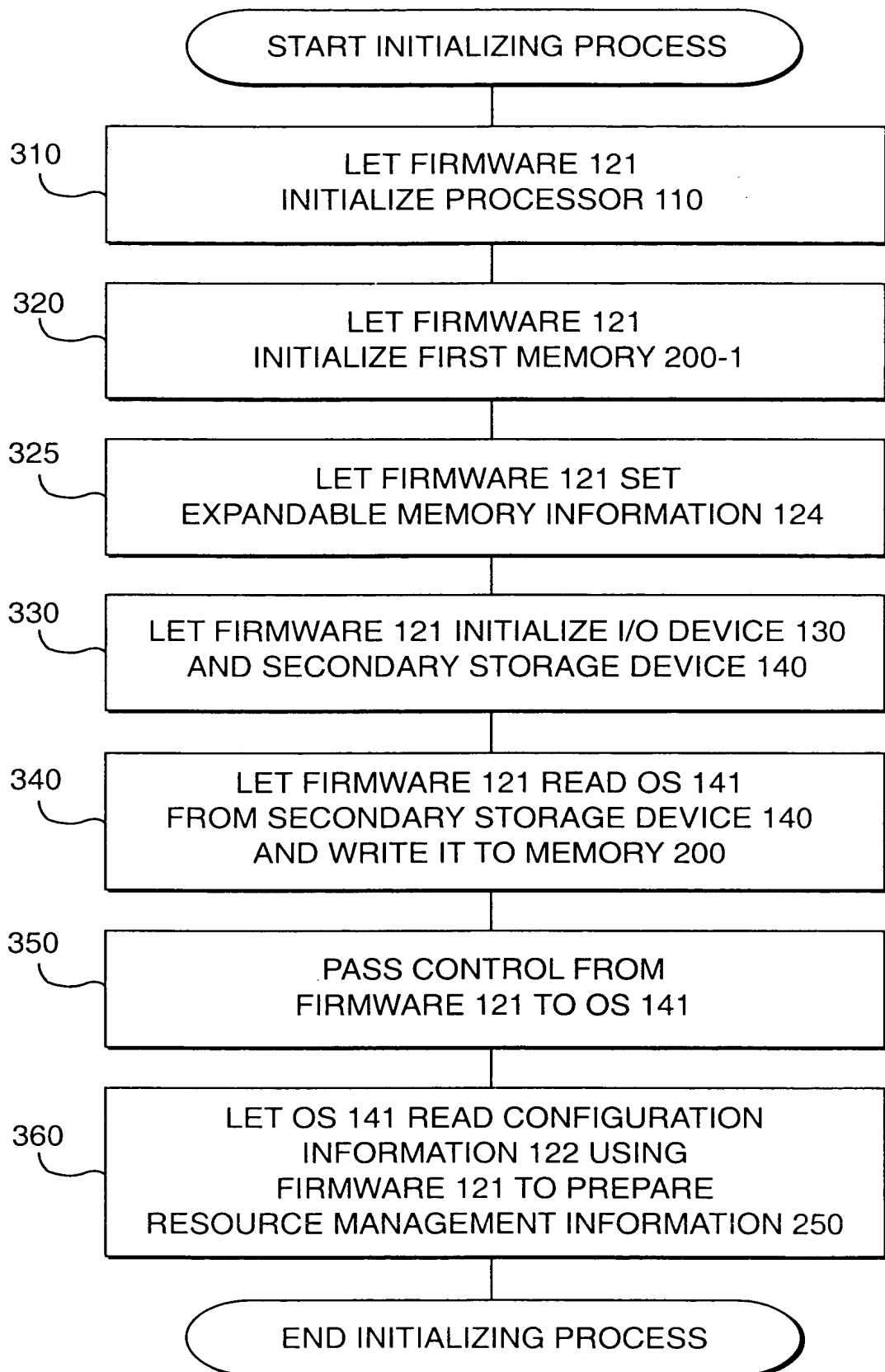


FIG. 13

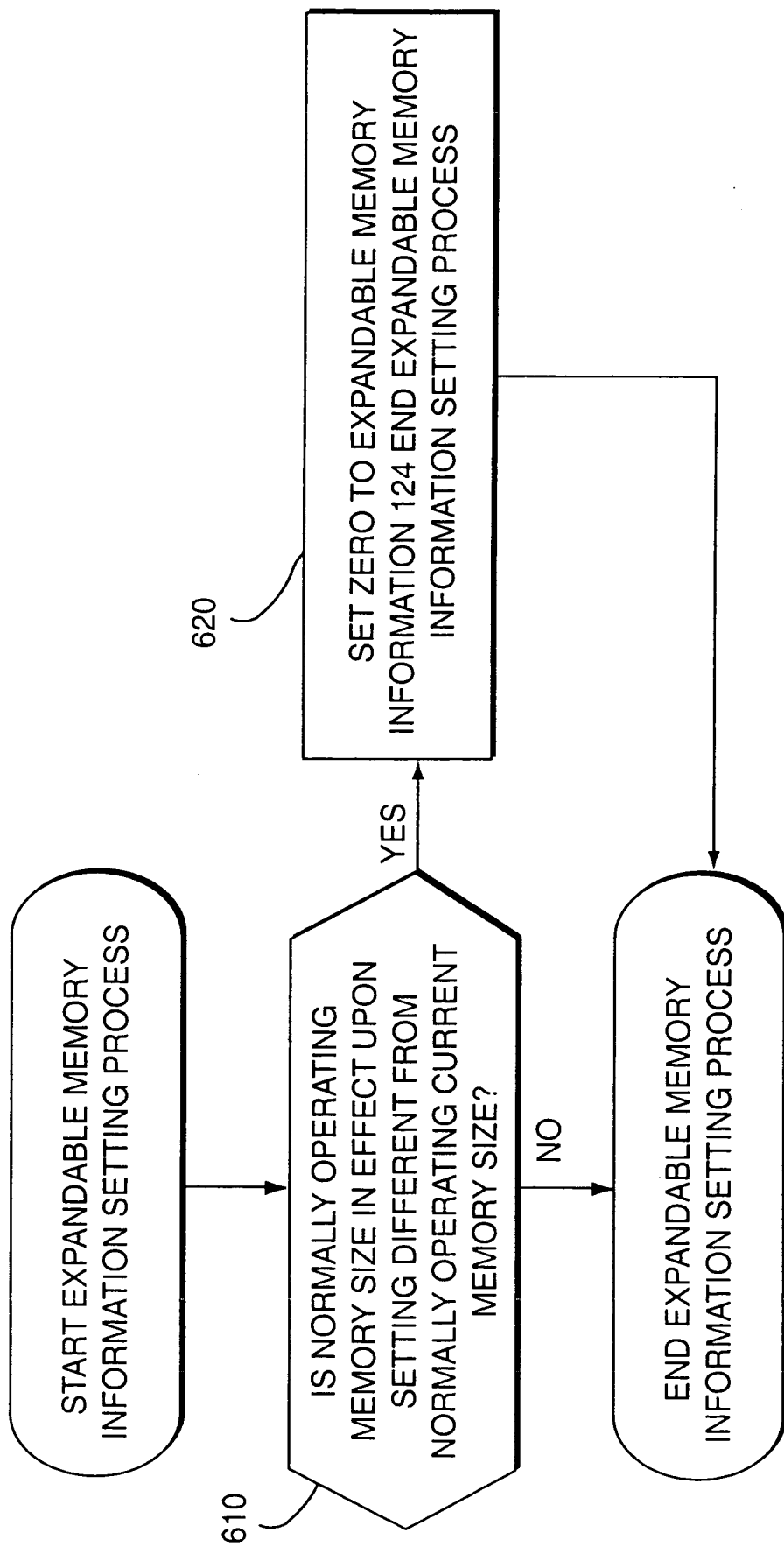


FIG. 14

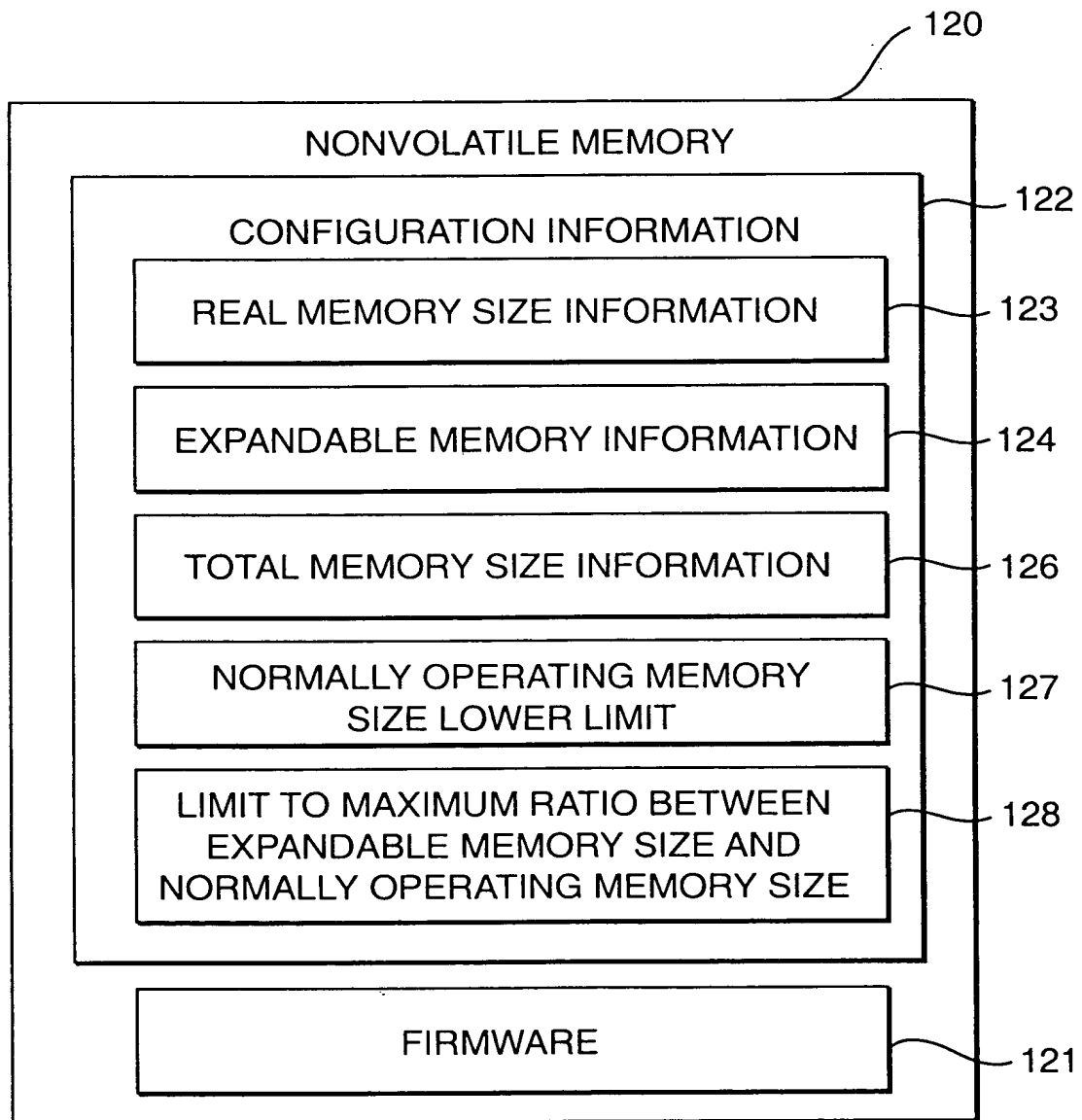


FIG. 15

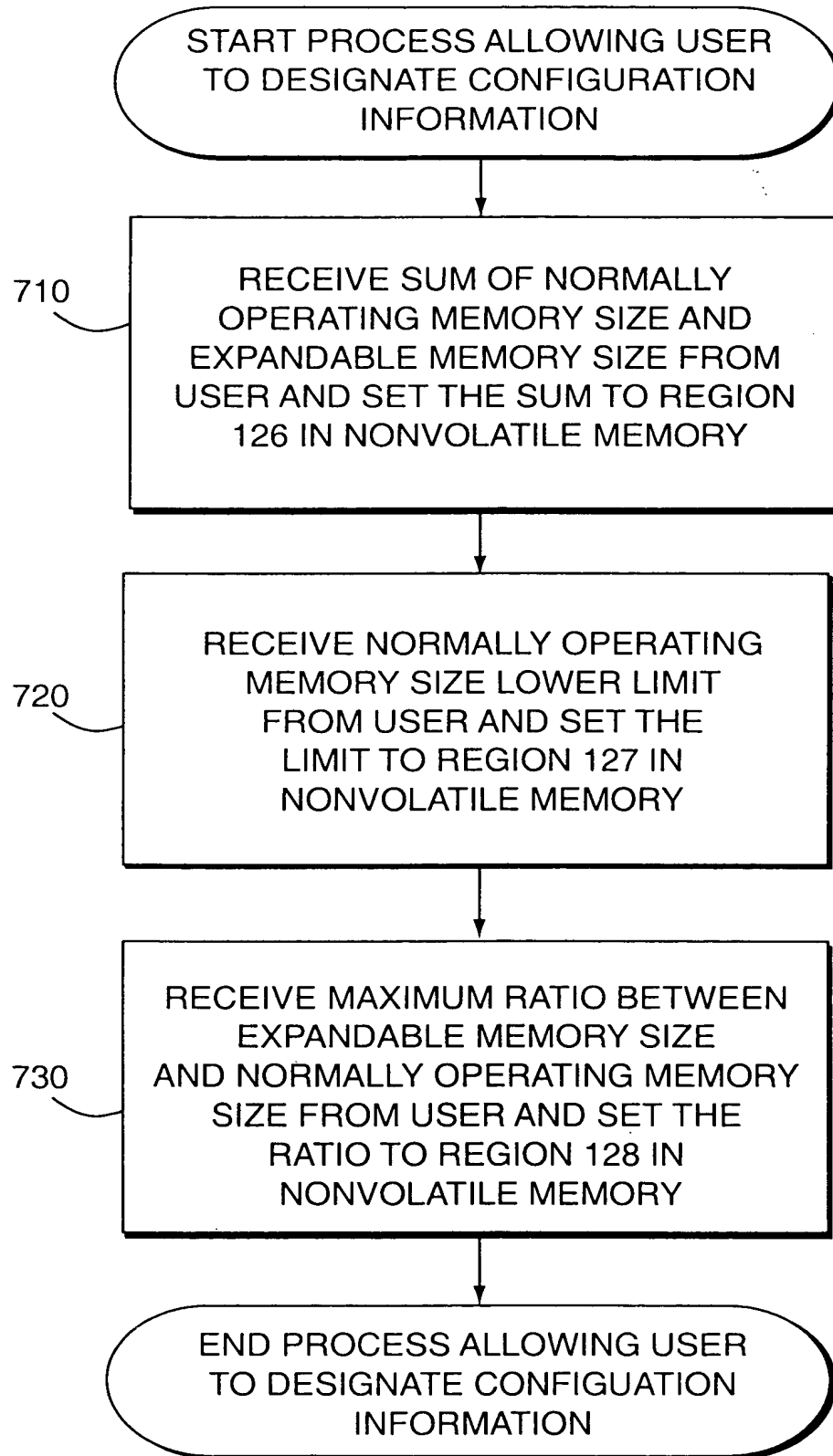


FIG. 16

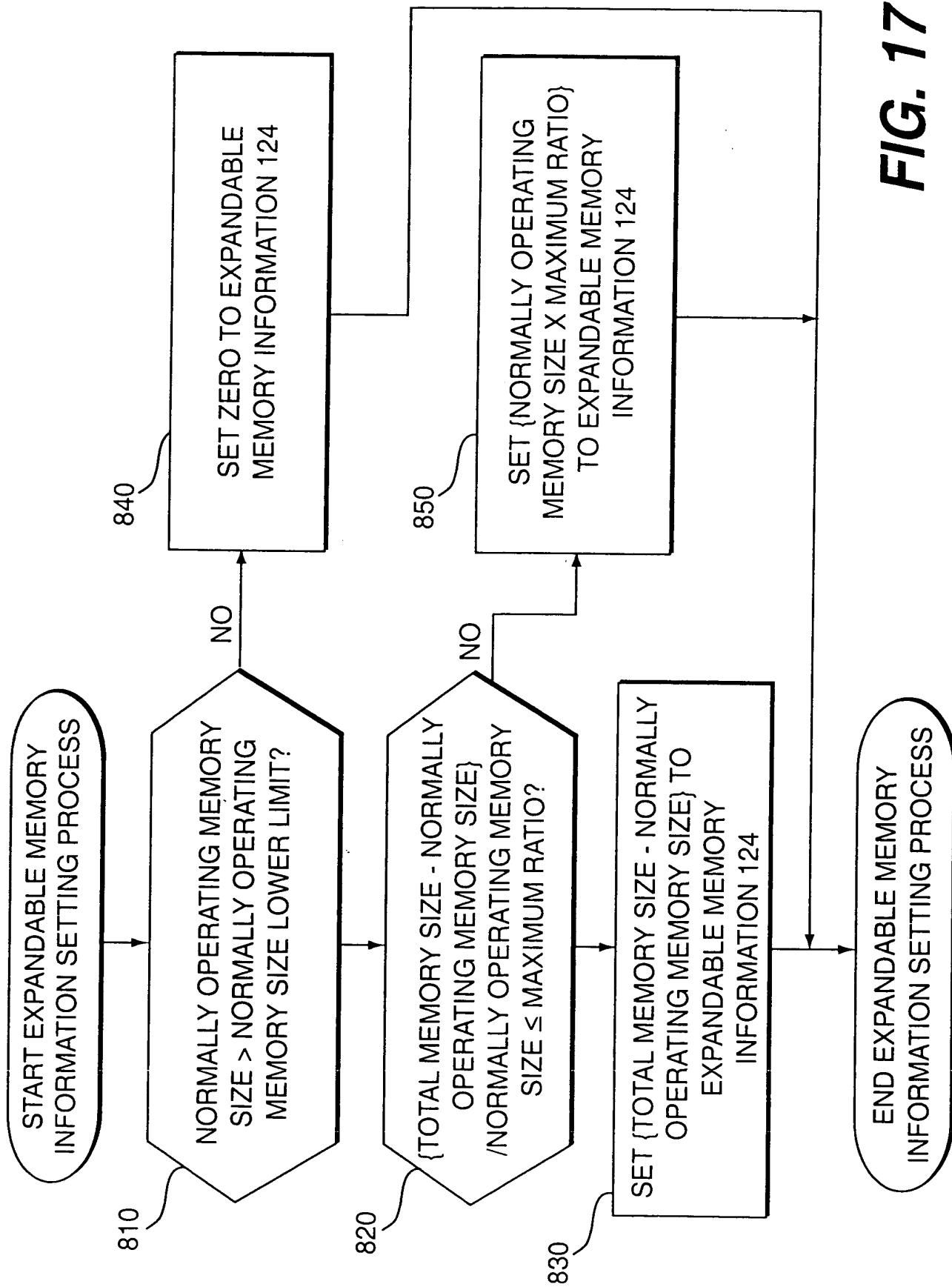


FIG. 17